

## Accelerating Interconnection Through AI

### Common Themes:

- **Role of AI in Improving Efficiency:** AI tools can significantly reduce man-hours and improve processing times by automating repetitive tasks and providing more accurate data analyses.
- **Importance of Standardization:** Harmonizing data inputs, assumptions, and processes across different ISOs and utilities is critical for the successful implementation of AI solutions.
- **Collaboration and Communication:** Effective stakeholder engagement and transparent communication channels are necessary to address the complexities of the interconnection process.
- **Data Accessibility and Security:** Secure and standardized data sharing mechanisms are essential to improve transparency and accessibility while ensuring data protection.
- **Workforce Development:** Continuous training and skill development in AI and power systems are necessary to address the shortage of skilled engineers and keep up with technological advancements.

### Action Items Identified by Participants

#### 1. Validate and Standardize Processes

- Characterize the duration and cycles of current interconnection processes to identify key pain points and areas for improvement.
- Standardize data inputs, assumptions, and submission criteria across ISOs and utilities.

#### 2. Enhance Communication and Training

- Develop a centralized communication portal for all stakeholders involved in the interconnection process.
- Provide training materials and resources for interconnection workforce development at both the academic and professional levels.
- Host informational events such as webinars and seminars to disseminate best practices and foster dialogue among stakeholders.

#### 3. Leverage AI and Automation

- Implement AI-driven tools for model validation, power flow analysis, and cost allocation to reduce manual workload and increase efficiency.
- Build a standardized platform for submitting and evaluating interconnection applications via API.

- Use AI to analyze historical data and identify patterns in application deficiencies and processing times.

#### 4. Address Data Accessibility and Security

- Create secure portals and standardized repositories for sharing critical data such as substation locations and transmission line information.
- Develop guidelines for data protection and cybersecurity to ensure the safe handling of sensitive information.

#### 5. Foster Collaborative Efforts

- Organize a government-industry working group to develop and standardize interconnection processes and tools.
- Support proof-of-concept projects and large-scale demonstrations to validate and refine new technologies and methodologies.
- Engage stakeholders in continuous dialogue to maintain momentum and ensure the adoption of best practices.

#### **Key questions and responses relevant to the AI4IX program:**

Where are some of the biggest time sinks in the interconnection queue? (e.g. model development, application deficiency notifications, etc.)

- **Model development and validation:** Building and solving power flow models takes extensive time. Industry is currently working on advancements in this area. Additionally, there are other funding opportunities focused on this topic.
- **Application review by multiple teams:** Coordination across different utility teams (engineering, contracts, environmental) leads to inefficiencies.
- **Resource limitations:** Review is stalled by lack of qualified workforce, limited vendors providing models, and few companies to resolve power flow models.

Where could automation or AI support the solutions for the process?

- Implementing a centralized communication portal for tracking and streamlining communication between utilities, developers, and RTOs.
- **Model validation and power flow analysis:** Automating these processes could reduce human error and speed up reviews. Industry is currently working on advancements in this area. Additionally, there are other funding opportunities focused on this topic.
- Leveraging AI to conduct the initial draft of rate cases or other documentation could reduce manual workload. Allow for 80/20 rule: focus engineering on 20%, AI is the other 80%.

- **Application intake and deficiency identification:** AI could automatically identify and flag deficiencies in applications. Might reduce reviewer-to-reviewer inconsistencies and could streamline the application process.
- **Cost allocation and site control evaluations:** Automation could streamline these evaluations and provide more accurate results.
- **Data management and visualization:** AI tools could help manage and interpret large datasets for better decision-making.

How long would it take to develop tools?

- **Model building/solving tools:** Approximately 2 years.
- **Application review tools:** Around 1 year to develop baseline digitization.
- **Scenario development tools:** Roughly 3 months.
- Overall tool development timeline depends on data availability and stakeholder consensus.

What are some of the challenges to the solution space?

- **Data access and quality:** Ensuring data is comprehensive, standardized, and secure.
- **Trust in AI tools:** Building confidence in the reliability and security of AI solutions.
- **Institutional inertia:** Overcoming resistance to change and securing necessary resources.
- **Workforce training:** Developing skills in both AI and power systems engineering.
- **Legal and contractual issues:** Addressing cybersecurity and data management concerns.
- **Coordination and collective vision:** Developing a roadmap and fostering coordination between industry, research, and government.